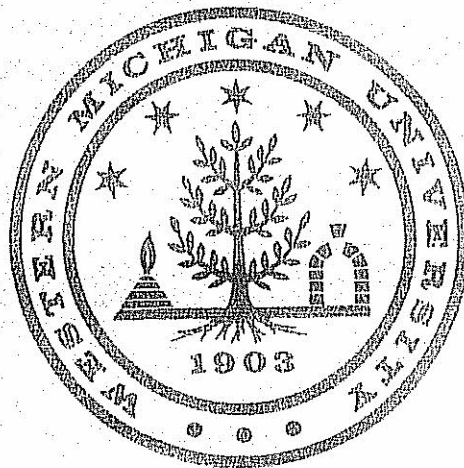


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A PROGRAM FOR TEACHING VERBAL REPERTOIRES TO PERSONS
IN WHOM LANGUAGE IS ABSENT OR DEFECTIVE

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TEACHING A VERBAL REPERTOIRE

Most humans come to rely on their verbal repertoires to a great degree. This is exemplified by the fact that our verbal behavior allows us to affect the environment in a variety of ways (e.g., we can ask for help, state our opinions, engage in conversations, read books, etc.). Also, the educational systems are mostly concerned with developing the student's verbal skills (e.g., reading, writing, arithmetic, forensics). Another aspect of language is that most "knowledge" can more adequately be described as the extent of the verbal repertoire. To say someone is knowledgeable in regards to Geophysics, for example, is to say he can state the essential features of the science, as well as accurately discuss its applications and future directions. He also may be considered knowledgeable in a non-verbal way, such as his manipulation of materials and equipment. But these repertoires are usually based on instructions or rules which, for the most part, are dependent on the individual's verbal skills.

Unfortunately, a large number of persons in our culture suffer due to weak verbal skills. For some, these deficiencies can go somewhat unnoticed as in the illiterate person who simply avoids textual material, or the stutterer who may avoid certain vowels, consonants, or vowel-consonant combinations because of the mild social punishment for sounding different or being an ineffective speaker. There are more serious problems, however, for the individual who fails to acquire the basic verbal skills necessary for manipulating his environment. These persons usually receive labels such as autistic, schizophrenic, aphasic, or

emotionally impaired and are often treated in a manner which further precludes any verbal development (e.g., institutionalization, medication, inappropriate programming).

Why Does One Fail To Acquire Verbal Behavior?

There are several possible explanations as to why such individuals would fail to acquire a verbal repertoire. These may include an early, but temporary hearing loss due to meningitis, german measles, etc., or some physical damage to the vocal musculature caused by infections, operations, cerebral palsy, etc., or a traumatic brain injury to the parietal lobe of the brain, or placement in an essentially non-verbal environment as in some state institutions. A somewhat speculative explanation might be that verbal behavior fails to develop due to extensive punishment for early vocal behavior (e.g., "Shut up", "Why do you always make noise?"). However, with the exception of obvious cases (e.g., cerebral palsy, traumatic brain injury) it is usually quite difficult to determine the specific cause for an individual's loss. A child with a temporary hearing loss, for example, may be placed in an institution where the staff infrequently require the individual to verbalize. When the child attends school (fortunately due to PL 94-142 mandatory education for the handicapped) all are mystified with a physiologically normal child who can't talk. Unfortunately, when environmental causes can't be identified, the educators and specialists invent internal deficiencies (as in minimal brain dysfunction or defective language acquisition devices) which are not explanations but are often stated as such (e.g., he can't talk because he has minimal brain dysfunction). This only removes the responsibility from the educators and, as a result, the search for solutions is discontinued.

The By-Products Of A Defective Verbal Repertoire

The individual who fails to acquire the conventional verbal repertoire will probably acquire some other means of verbally affecting the environment. The specific topography varies greatly for each person (this is mainly a function of their reinforcement history). High rates of activity, for example seem to be common among such individuals. This can result in extensive attention (e.g., chasing, reprimanding) by parents or staff, thereby having an effect on the environment which functions as reinforcement and maintains the behavior targeted for elimination. Such was of inducing adults and other children to behave can be very reinforcing when other means are unavailable. A child learns that his mother will look at him, scream, get up and run across the room if he climbs into the baby's crib. This may be followed by some mild punishment, thereby decreasing climbing in the crib; but the reinforcement of the specific environmental change probably maintains large classes of behavior and other topographies will eventually come to strength. A fish tank, for example, contains some of the defining features of a crib (i.e., four legs, opening at the top) and that stimulus may control similar climbing behavior which, again, would result in the parents' attention followed by mild punishment and the cycle continues. The parent may heavily reinforce appropriate behavior, but this is poor competition for the reinforcement from specific environmental control. As a result, parents may give up and institutionalize the child.

Other behaviors such as aggression, screaming, tantrumming, or extensive babbling also affect the environment in a consistent way. All these behaviors can function as verbal behavior for such individuals because the conventional ways of environmental change (vocal-verbal

behavior) are not functional for them.

Traditional Treatment Programs

Most programs for language training are, of course, based on the theories developed within the field of linguistics. The works of persons such as Eric Lenneberg, Noam Chomsky and Ursula Bellugi have played an important role in this development. Unfortunately, the field has always been an unstable one due to its necessary reliance on the field of psychology -- thus its outgrowth: psycholinguistics (e.g., theorists such as Roger Brown, Jean Piaget). The structure of language is considered to be the structure of thought. Then it becomes the job of the psychologist to understand the structure of such mental events. Unfortunately, those who explain behavior in terms of internal mediating events between the environment and the organism must in turn explain the mediating events. That is, to explain behavior in such terms as ideas, feelings, meanings, intentions, etc., leaves us yet another explanatory task. B.F. Skinner (1969) states that ". . . The objection is not that these things are mental but that they offer no real explanation and stand in the way of a more effective analysis. This sort of psychologizing was wisely rejected by linguists in the early years of the century, but efforts to find a behavioral alternative, particularly by Leonard Bloomfield (1933), failed because of the shortcomings of the stimulus-response psychology that was dominant at that time. The result was either a pure structuralism or a return to mentalistic explanations such as those of generative grammarians." (p. 10).

Perhaps Skinner's most original contribution to the field of psychology has been to surpass the psychological conception summarized by the stimulus-response formula without falling into traditional appeals to

the intervening or mediating variables (Richelle, 1976). This event was in part responsible for Skinner's efforts to find a behavioral alternative to the analysis of language -- which he did, and published in the book Verbal Behavior (1957). In light of Skinner's analysis and data gathered within the field of the Experimental Analysis of Behavior, new approaches to language teaching and remediation have been explored (Braam, Sundberg and Stafford, 1978; Breuning, 1978; Stafford, Sundberg and Braam, 1978; Sundberg, 1978; Sundberg, Milani and Partington, 1977; Sundberg, Michael and Peterson, 1977; Sundberg, Ray and Rueber, 1978). The essential feature of Skinner's analysis is an emphasis on language as behavior controlled by its relationship with antecedent and consequent environmental events (see Appendix 1) as well as those operations that establish those consequences as effective forms (this concept is called Establishing Operation by Michael, 1978). This differs from the traditional analysis which places emphasis on the topography alone, that is, the phoneme, spoken word, or sentence without respect to the behavior of the individual speaker.

A Program For The Acquisition Of Verbal Behavior

Expressive/Receptive - A Necessary Distinction: In traditional treatments of language it is common to minimize differences between the behavior of the speaker and the listener. It is said that the essential feature of both is "the understanding of the meaning of words". The two different behaviors are then characterized as simply the expressive or receptive manifestation of this understanding. However, a close analysis points up important differences which must be considered when training a verbal repertoire. A receptive repertoire falls far short of meeting the requirements for classification as verbal behavior. The lack of

6.
specific topographies for objects, actions, etc., precludes the occurrence of several verbal relationships which will be described in later sections (i.e., intraverbal, textual, and parts of the mand). Therefore, emphasis on this repertoire should be minimal, especially since an expressive repertoire usually contains the necessary skill for receptive discrimination. That is, if one can say "cup" in the presence of cup it probably would not take much, if any, training to get him to touch a cup when instructed to do so. For these reasons, I will concentrate on the behavior of the speaker/signer/pointer rather than the listener/observer. It is primarily by speaking/signing/pointing that an individual benefits most directly from his language repertoire. Also, listening when language stimuli are simple seems little different from reacting to non-language stimuli. And on the other hand, reacting to more complex language stimuli seem to depend considerably upon behaving in part as a speaker (for a more detailed treatment on this topic see Sundberg, Ray and Rueber, 1978).

Selection Of A Response Topography

It is often very difficult to choose a response mode that is most appropriate for the person. There seem to be three main response modes: vocal, sign language, and pointing to visual stimuli. Each mode has advantages as well as disadvantages (writing could also be considered, but, due to its extensive reliance on vocal behavior, it is of little benefit for early language training - see Textual section). A vocal system is, of course, preferred because of its use by other members of the culture. Systematic application of the program described below should improve the vocal repertoire of most students; however, the degree of improvement is dependent upon each particular student's

individual history and handicap. Such histories typically involve frequent failure to affect the environment and considerable urging on the part of others to attempt such interactions. This situation can be quite punishing and may result in a variety of inappropriate behaviors (like those described above). The use of a sign or pointing system will provide much more consistent and immediate reinforcement for language behavior. Also, such systems will provide a new topography which has not been associated with punishment.

The decision to use a sign system should, of course, be a careful one. The person must have the dexterity to make the signs and someone to teach him. Also, the environment must provide a verbal community for maximal development (Sundberg, Milani and Partington, 1977). Also, see section on Verbal Community. However, the success of the various sign systems has been well documented within the literature (for a review see Fristoe and Lloyd, 1977).

There are clear reasons why such populations can acquire sign language more readily than vocal language. First, the form of the response is easier to teach. That is, the learner's hands can be placed in the appropriate position, whereas the vocal musculature can only be altered indirectly. This makes the shaping process quicker, as well as allowing for more clear and unambiguous models of the appropriate response.

A second feature of a signing system is the greater potential for resemblance of the sign and the controlling variable. The sign for food, for example, is made by moving the closed finger tips to the mouth as in the process of eating. Because a large number of signs do resemble some aspects of the variable controlling the response, the controlling relationships are probably easier to develop. Another feature of a signing system is the use of a novel topography; that is, the person does not

have a past history of failure in that mode (for a more detailed analysis of sign language, see Sundberg, Michael and Peterson, 1977).

For severely physically impaired individuals who lack the dexterity for sign language, a pointing symbol system is appropriate. It has advantages over a sign system in that the audience need not be specifically trained in a new language (symbol systems usually have the English word printed below the symbol). Unfortunately, there are some verbal limitations of such systems. Mainly, the basic elements of the language are not part of the individual's musculature (as in vocal behavior and signs). Symbol systems require the use of a board which is extraneous to the individual and precludes several key features to verbal development (e.g., babbling, correct verbal behavior). However, for the individual who has neither the vocal or physical capabilities for the other systems, a pointing system will certainly provide a functional verbal repertoire.

Preliminary Observations

Prior to beginning the actual teaching of a verbal repertoire it is critical to observe the person for several days. This will allow the therapist to collect specific data and design the program using a much more functional vocabulary. The data of interest are: 1) the objects and events which appear to function as reinforcement for the person (e.g., food, water, tickle, pop, car, ball, ride, lights, music). To find such items, try asking the person to pick one under several different circumstances. One may also observe the person during free time or record the person's response rate on some motor task (e.g., ring stacking) using different items as reinforcement. (For some children, any novel item or action can function as reinforcement and these can change daily.

Therefore, try and avoid temporary forms of reinforcement during the beginning stages of the language program.) Then select items which resulted in the highest response rate. These items which function as reinforcement should constitute the first group of words, signs or pointing symbols (approximately 5 to 10 topographies should be used). 2) Then select objects (5-10) within the immediate environment of the person (e.g., table, chair, book, cup, paper, pencil). 3) Then select actions (5-10) which the person frequently engages in or observes (e.g., stand, sit, jump, walk, run, open, close). These should constitute the first 20 to 30 topographies to be taught (see Appendix 2 for further selection of topographies).

Data Collection System

Recording correct, incorrect and inappropriate responses is an extremely valuable tool in language training. A record of performance will allow one to spot difficulties, project development and be assured of progress. A complete Verbal Behavior data collection system can be found in Ray and Sundberg, 1978).

Training Program

The Copy Repertoire: In the process of developing a verbal repertoire a normal child acquires echoic behavior. That is, the child learns to make the same sounds that others make. This is exemplified by the fact that children begin to babble using the phonemes of the parents' language. On the other hand, a deaf child (who has deaf parents) will acquire an imitative manual repertoire. This is probably due to the pairings between an adult's vocal (or signed) behavior and primary reinforcement (parents usually talk to their infant when they feed it, cuddle it, etc.). Eventually, a child's vocal response which sounds

like the parents' functions as reinforcement for the child because of the previous pairings. Skinner (1957) calls this phenomenon Automatic Reinforcement. This type of behavior can be classified as copy behavior, which plays a critical role in verbal development. Adults and educators make extensive use of copy repertoires to develop other verbal relationships. If a child can say "candy", for example, when the parent says "candy", then they can teach him to say candy in the presence of candy, as in "This is candy, say candy. What is this? That's right, 'candy'; here, have some candy". Eventually, the child learns to name as well as ask for candy. Another example is a child's tendency to say "da da"; it is first echoically strengthened -- the father says "da da, say da da" and eventually the normal child will say "da da" usually quite often and at first probably incorrectly; that is, he calls everyone "da da", and eventually, through discrimination training, "da da" will come under the control of the appropriate stimulus (the father).

The issue of concern in this section is how does one teach such a copy repertoire? It is clear that such behavior is essential for future verbal development, and for the non-verbal individual this is even more important.

We have identified three different topographies (vocal, sign language and pointing to symbols) which can be used in training verbal behavior. The basic paradigm used to train these repertoires is the same. However, the extent of the training required for developing copy behavior is greatly different for each topography. A symbol system only requires a pointing response be under copy control. A sign system requires that several movements, both gross and fine motor, be under control. And most complex, of course, is vocal copy behavior. Such copy control can only be achieved indirectly; that is, you cannot place the appropriate

musculature in the appropriate position at the appropriate time. This is especially difficult considering that vocal behavior involves the diaphragm, the vocal cords, the false vocal cords, the epiglottis, the soft palate, the tongue, the cheek, the lips and the jaw. Nevertheless, as a result of hundreds of thousands of reinforced trials, the normal child comes under strong copy control.

The Basic Paradigm for Developing Copy Control: Behavior becomes under the control of a specific stimulus when the behavior is reinforced in the presence of that stimulus. In learning a new person's name, for example, we may first ask him his name, perhaps repeat it, "Jose, Jose. That's a nice name", and Jose says, "That's right, Jose". Later the stimulus of Jose himself increases our tendency to say "Jose", rather than John or Bill. It may take several times for the response to come under strong stimulus control; that is, "Jose" may be a weak response until several trials have occurred (e.g., "No, my name is Jose").

This paradigm of stimulus control is consistent regardless of the specific topography used. Our terminal objective is to get the person to copy the vocalization and/or gestures of the teacher. For some persons this may be extremely easy to develop (e.g., several non-verbal persons have strong imitation skills); however, for others it may require very small steps and extensive training (at this point, the teacher should know if a person is appropriate for a vocal system or a sign system).

Procedures for the Individual with Little or No Vocal/Gesture Behavior: There are some non-verbal persons who virtually never vocalize or gesture. In training language to these persons, we must first bring some behavior under copy control. There appear to be three different classes of objects/events which will help us to develop copy control. These are: 1) Deprivation conditions such as hunger, thirst and physical

contact or aversive stimuli such as pain and discomfort. 2) Objects and actions in the person's environment (those that function as reinforcement work best -- e.g., food, pop, tickle, hug), and 3) Verbal behavior on the part of the teacher (such as, "Say ahh"). These stimuli have the highest probability of evoking vocal-gesture behavior when presented in combinations, as in waving a milk bottle in front of a hungry child while verbalizing "mmm". Eventually each individual stimulus should come to control the response. Our objective in this case would be to get the child to vocalize "mmm" totally under the control of the teacher's "mmm". Eventually, the person should learn to vocalize "mmm" totally under control of the non-verbal stimulus of milk, as well as "mmm" when milk would function as reinforcement, but these repertoires will be dealt with in later sections.

Copy behavior plays an extremely important role in verbal development. Such a repertoire is optimal for evoking a response in order to set up other kinds of stimulus control as in teaching the names of things. Suppose we wanted to teach a person to name a chair. We would want to do this, of course, by reinforcing the response "chair" (or an approximation) in the presence of a chair. But we cannot wait until such a response appears "spontaneously", and the method of shaping successive approximations may take too much time. If we can evoke the response as an assemblage of small copy units never before arranged in this order, the behavior can be suitably reinforced, and the chair as a stimulus will acquire some control over the response (Skinner, 1957).

Even as adults, our copy repertoires continue to play a major role. Instructions, for example, are frequently repeated to insure their correct execution. New words are often repeated several times in order to insure correct pronunciation. Also, we pick up a large part of our verbal

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repertoire by echoing the behavior of others under circumstances which will eventually control the behavior non-echoically. We hear someone saying "This is electrified, don't touch it!", and later we see a small boy about to approach the wire and we say, "That is electrified, don't touch it!".

In conclusion, the development of echoic/imitative behavior is essential to the growth of the verbal repertoire. Copy behavior allows us to teach a person much more complex forms of verbal behavior. That is, we can teach him the names of objects and actions as well as to ask for them. Also, we can teach him how to talk about them as in a conversation and, even more complex, we can teach him to appropriately react to written stimuli concerning them.

The rest of the paper deals with teaching these more complex forms of verbal behavior, which include the asking for and the naming of objects and actions within the person's environment, as well as reading, writing and conversation skills.

The Mand Repertoire

A large part of our verbal repertoire involves asking for objects and actions. This repertoire differs from the others described in this paper in that a response is controlled by the establishing operation (e.g., deprivation, aversive stimulation) and characteristically reinforced by a specific object or event. That is, when we ask for things we specify what will be reinforcing at that time. Asking for help, for example, specifies that some assistance would function as reinforcement, or asking for someone to "move" specifies the reinforcing properties of a clear path. Our asking for something is controlled by what would function as reinforcement at that time (e.g., "Water, please", "Can I

go outside?", "What's that?"). Skinner thought it useful to call this type of relationship "manding". The variables controlling a mand consist of some environmental change which increases the value of a particular object or event as a form of reinforcement at that time and as a result increase the strength of the behaviors which have obtained that reinforcement in the past (for a detailed analysis of this issue, see Michael, 1978). The reinforcement is typically specific for the mand as contrasted to nonspecific, which is characteristic for the tact - see next section.

Mands are usually a child's first form of verbal behavior. Crying can be a mand for food, water, attention, or the removal of an aversive stimulus. As the child learns more topographies (through procedures described in the section on copy repertoires) they will become associated with a specific form of reinforcement (e.g., "da da" will eventually be shaped for father or "mmm" for milk).

The process by which a normal child comes to learn a topography for a specific form of reinforcement is usually a long one. That is, a child is usually more than one year old before he can specify many of his reinforcements with conventional topographies (i.e., an accepted approximation). This time can be greatly reduced with careful programming. The essential features of such programming would simply involve the use of specific reinforcement for specific phonemes/gestures. Typically, when a child begins to make its first sounds they are followed by a variety of reinforcements (e.g., food, water, hugs). This variety of consequences probably delays the acquisition of specific topographies for objects and actions. If parents and teachers are consistent with their reinforcement, a child will acquire more conventional verbal behavior sooner.

When teaching language to the individual in whom it is absent or defective, we should likewise begin with objects and events that function as reinforcement. If the student has a strong copy repertoire, this phase will be very easy. The teacher first says/signs, for example, "This is pop. Say/sign pop". If the student gives the word/sign or an acceptable approximation they should receive some pop. (Note: This is still only copy behavior, that is, the teacher saying/signing pop probably controlled the student's response). Now the teacher should say, "What do you want?" If the student says/signs "pop" reinforce him with pop. After the student has met a desired criterion, train on other forms of reinforcement. For the student with a weak copy repertoire specific reinforcement can be used to shape the wanted topography. The teacher says, "Do this, (says/signs) 'pop'" and reinforces successive approximations with pop. The students will, of course, satiate after several trials, so small quantities of reinforcement should be delivered and when they would most likely function as reinforcement.

Mand Training - Phase II: Phase I mand training should be continued until the student has five to ten topographies for specific forms of reinforcement. Then the teacher should move on to tact training (see next section) to provide the student with the topographies for other objects and actions in his environment. However, this does not mean mand training should be abandoned. We must proceed along two tracks: first, it is critical that a student be required to emit the specific topography associated with a certain form of reinforcement before obtaining it; and opportunities for obtaining such reinforcement should be set up across 1) the day, 2) teachers, 3) settings, and 4) varieties of the reinforcing stimulus (e.g., different kinds of pop). The second

track consists of developing a very critical repertoire for language expansion -- question asking (textual behavior also expands the verbal repertoire - see that section). Such a repertoire allows a person to acquire more verbal behavior. As normal speaking persons we ask for the names of unknown objects and actions, the location and functions of such items, as well as instructions as to their use. Once a person has an extensive manding repertoire, he can essentially provide himself with language training.

All these repertoires must be trained and used in the natural environment. Such training is, of course, dependant on the acquisition of a specific topography (i.e., who, do, what, where, when, why & how); however, these are usually difficult to teach when a person has only a few topographies. Nonetheless, they should be worked on as soon as possible (for more details on the nature of a manding repertoire and the development of verbal behavior see Michael, 1978. Also, for an experimental analysis of the repertoire see Stafford, Sundberg and Braam, 1978; and for additional training programs see Guess, Sailor and Baer, 1976).

The Tact Repertoire

Skinner suggested the term "tact" (as in contact or tactile) for the type of verbal relationship where the topography of the response (what is said, signed or pointed to) is controlled by a prior non-verbal stimulus. The common non-verbal stimuli in a child's environment are objects (e.g., cup, tree, book), actions (e.g., stand, jump, zip), properties of objects and actions (e.g., red, hot, wet, quick, slow, quiet), and relationships (e.g., on, in, above). The reinforcement for the tact is usually social, or non-specific. A lost person may mand to you "What building is that?" Your response would be, in part,

controlled by the verbal stimulus; but what you would say, that is the topography of your response, would be controlled by the building itself. "That is Wood Hall." This would characteristically be followed by some social reinforcement such as "Thank you". Therefore, tacting can be thought of as naming, whereas manding can be thought of as asking. Note how tacting benefits the listener, whereas manding benefits the speaker. Also, it's important to point out that we can ask for or name the same object or action. One can say "water", for example, because he wants water, or one can say "water" because he sees water. Both are different repertoires and must individually be trained -- in one condition the water is there, and in another it might be absent. It's easy to observe a young child's weak manding repertoire as in "I want that what-cha-ma-call-it", but if you show him the object, he can surely name it. Traditional programs fail to note these differences and simply teach topographies without regard to the circumstance under which they are used. A child may be able to say "cup" in the presence of a cup but not ask for one when he wants one. When working with individuals in whom verbal behavior is defective these differences become much more apparent.

Training a Tact Repertoire: As mentioned previously, first select objects (nouns) within the person's immediate environment (e.g., chair, pen, paper, window, shoe, shirt, coat). These are most familiar and a person would have a greater tendency to verbalize about such items. The training procedure would be the same as that used for mands except social or non-specific reinforcement should be used, and the trial should begin with the stimulus "What is that?"

Actions (verbs) should be selected and taught next (e.g., come, go, stand, sit, jump, pull, push). These are usually a little more difficult to acquire because of their transitory nature. An object is constant

(e.g., a table) and has only a few varying characteristics (see the section on Tact Extension). Actions, on the other hand, involve a number of transitory events. Jumping, for example, is usually done differently by each person, and large numbers of irrelevant features are included (i.e., height off the floor, various body movements, location of jump). For actions, the teacher should change the initial stimulus to "What are you doing?" or "What am I doing?"

While new topographies are being acquired it is important that procedures for teaching a person how to combine the words be ongoing. The person should learn to tact objects and actions. If the stimulus is a boy jumping on a chair, for example, the person should be taught to tact jump - chair (later, as the person acquires more topographies, he will be able to tact more of the stimuli in this situation). Also, a person can mand using any topography in his repertoire. Therefore, the child should be taught, for example, to ask for chair when he wants one, as well as asking for combinations of objects and action.

Next, the person should learn topographies for the relationships (prepositions) between objects, as well as between objects and actions (e.g., in, on, above, below, out, between). The procedure is again the same with the exception of a different stimulus; "Where is ____" should be used. Once the person learns a topography for a relationship, procedures should be used to train the person how to use that relationship in combination with other objects and actions. And, of course, to ask for object-relationship-action as well as using several topographies and arrangements.

Properties of objects, then actions, are usually the next repertoires acquired by normal children. These are a little more difficult because of their relative nature. Fast, for example is a property which can be

given to a car; however, a car is slow when compared to a train. It simply requires more trials for the normal child to acquire these behaviors. For the language-delayed person, these may be difficult repertoires to teach; however, specific procedures and consistent training can usually help them. Once the person has objects, properties of objects, actions and relationships they can have a good effect on the environment; that is, they can ask for and receive, as well as name, complex objects and events in their environment.

In conclusion, our objective in tact training is to provide a person with a repertoire which will allow him to effectively react to objects and actions in his environment. As mentioned previously, the reinforcement for such behavior is social and usually benefits the listener (e.g., being able to name things is important when people ask us about them; we also need to be able to name their function as well as describe how they work). A mand repertoire usually benefits a speaker; he can ask for the names of things so that later he can effectively ask for the thing itself. A person may say "What is that?" (mand). A listener may say, "That's a shackle" (tact). When a shackle would function as reinforcement, now the speaker can say, "Can I have that shackle?" (mand).

Tact Extension: Immediately following training on a specific object, action, relationship, etc., it is important that the student be able to respond appropriately in the presence of new stimuli which resemble those previously named. Skinner (1957) opens his section on the extended tact by writing:

"If a chair, acting as a stimulus, made the response 'chair' probable, and if a cribbage board, acting as a stimulus, simply made the response 'cribbage board' probably, we could deal with the 'semantics' of verbal behavior merely by supplying an inventory of tacts. But a verbal repertoire is not like a passenger list on a ship or plane, in which one name corresponds to one person with no one omitted or named twice. Stimulus control is

by no means so precise. If a response is reinforced upon a given occasion or class of occasions, any feature of that occasion or common to that class appears to gain some measure of control. A novel stimulus possessing one such feature may evoke a response. There are several ways in which a novel stimulus may resemble a stimulus previously present when a response was reinforced and hence there are several types of what we may call 'extended tact'." (p. 82)

Skinner goes on to describe three types of extension: generic, metaphoric and metonymic. These distinctions are based on the degree to which some novel stimulus differs from that trained. He makes this distinction in terms of the defining features of that stimulus. The defining features of a chair, for example, would consist of four legs, a back, space for one person, etc. Thus, the response "chair" in the presence of a stimulus which has all these features would be reinforced by our verbal community; Skinner calls this generic extension. A couch, on the other hand, has some, but not all, of these defining features -- as well as some others -- and the response "chair" would be punished. Considering that it does have some of the defining features of a chair (i.e., four legs, a back, etc.), if a person who had a small verbal repertoire called it a "chair", the response would not be totally incorrect. Skinner calls those responses to novel stimuli which have some of the defining features of the trained stimulus metaphorical extension. Finally, a person may have some tendency to say "chair" in the presence of a stimulus which has none of the defining features, but has been associated with the defining features. The color red, for example, may evoke the response "chair" if the original training stimulus was a red chair. Skinner calls this type of behavior metonymical extension.

Teaching Tact Extensions: For purposes of teaching a verbal repertoire we are only interested in generic extension. If a child learns to say/sign/point to "cup" in the presence of a large white coffee cup it is

important that he be able to make the same response in the presence of a small brown coffee cup. Metaphorical and metonymical extensions are not irrelevant, of course, but we are only interested in their occurrence in the natural environment; teaching such behavior seems antithetical.

To train such a repertoire, one simply need present the person with novel (untrained) items and continue to shape the response until the behavior becomes strong. This should be done with every topography acquired. Also, it should be done across the day, with different teachers, and in different types of learning situations (see section on the verbal community). It is also important to conduct tact training across different sense modes. If a child can verbalize "water" when he sees water, it should not be taken for granted that he can verbalize "water" when he touches, tastes, or hears water.

• The Intraverbal Repertoire

In the copy repertoire mentioned previously, there is a close correspondence between the controlling stimulus and the response produced by that stimulus. Thus, the echoic/imitated response sounds/looks like the stimulus that determined the specific topography of the response. That is, when a child responds "da da", it sounds/looks pretty much like the same word that was spoken by the teacher. But we can also react to another person's verbal behavior with responses which do not produce similar stimuli. Thus, on hearing someone say "table" we may have some tendency to say chair. Such a tendency would probably not result in overt behavior under ordinary circumstances, but it could be seen quite easily if instructions were given to "Say the first thing that comes to mind when I say 'table'", as in a word association experiment. This type of verbal relationship is called "intraverbal" by Skinner, and it plays an important role in normal language.

In the educational setting much intraverbal behavior is developed as in conversations, reciting poems and stories, singing songs, stating all the properties of objects or events, listing the colors, the common shapes, "things to write with", etc. This type of training results in fairly strong tendencies for certain verbal stimuli to increase the probability of certain verbal responses other than copying responses. Some are relatively trivial in their communicative effect, such as tendencies to say "butter" on hearing or seeing the word "bread". These "word associations" are not trivial, however, in their role in facilitating effective verbal behavior by a speaker/signer/pointer. Our intraverbal repertoires are quite important for rapid and effective speaking and listening. For example, it is relatively important that the verbal responses "butter, white, whole wheat, eat, meal, toast, etc.", all be readily available in our repertoire when bread is being introduced into a conversation. Intraverbal relationships between the stimulus "color" and such responses as "red, blue, green, etc.", play an important role when we are asked to verbalize about the colors of objects.

The reinforcement for intraverbal behavior, as with copy and tact behavior is at first educational and social, but eventually is related to its facilitative effect on one's own verbal behavior as well as the action the listener takes as a result of the speaker's behavior.

In learning a foreign language the "translations" or "vocabulary" lists are intraverbal behavior. Thus, any tendency to say "mesa" as a result of seeing or hearing the English word "table" is intraverbal: the stimulus is verbal, and the response is not a copying response -- that is, it does not duplicate the properties of the stimulus (saying either "table" or "mesa" as a result of seeing or touching a table would, of course, exemplify the tact relationship since the topography

of the response, either English or Spanish, is determined by the non-verbal stimulus of the table. Saying either table or mesa as a result of wanting a table would, of course, exemplify the mand relationship since the topography of the response, either English or Spanish, is determined by what would function as reinforcement for the speaker).

It is often at this point where a person with defective verbal skills fails to appropriately affect the environment. The repertoire is certainly complex and requires special verbal skills on the part of the student. To train such skills, first the student should be able to produce a different but related verbal response to a verbal stimulus from his current repertoire. The response "pencil", for example, can be trained to occur as a function of the stimulus "paper". The student is presented with the stimulus and reinforced if a correct response occurs, or taken through a correction procedure until it does. This training can then be extended to reinforcing only novel, but appropriate, responses to a specific stimulus. Then the complexity of the stimulus and the response required can be increased. (A more detailed treatment and an experimental analysis of the acquisition of an intra-verbal repertoire may be found in Braam, Sundberg and Stafford, 1978.)

The Textual Repertoire

A normal child will usually acquire a textual repertoire after several years of traditional vocal-verbal training. This repertoire brings us to an interesting situation in our analysis of language acquisition -- the fact that for the first time we cannot verbally equate the topographies of vocal, sign and pointing behavior. In normal textual behavior, the stimulus consists of written or printed words, and the response consists of reading those words out loud. In some respects this is like copying behavior, except that the response does not produce a stimulus that

matches the controlling stimulus. That is, when you read out loud, you do not produce a written visual stimulus, but rather an auditory stimulus. In a sense, this auditory stimulus "matches" the written one, but not in the direct sense of "match" since they are in different sense modes. Still, saying "dog" as a result of seeing "dog" written on the chalkboard seems more of a match than saying "cat" as a result of seeing "dog" written there (an example of intraverbal behavior). Skinner used the term "point-to-point correspondence" to refer to this "lesser" type of matching -- thus, in textual behavior, the beginning of the stimulus is closely related to the beginning of the response; the middle of the stimulus control, the middle of the response, etc. In intraverbal behavior the controlling stimulus is the result of someone's verbal behavior -- that is, a spoken or written word, a manual sign, or a symbol pointed to, but it does not copy the stimulus, nor does it have point-to-point correspondence with it. Textual behavior doesn't copy, but it does have point-to-point correspondence (see Appendix 1).

However, there is a form of manual behavior which is analogous to textual behavior. Fingerspelling "d-o-g" as a result of seeing "dog" written somewhere would seem to be quite similar to textual behavior. With signing, however, it is somewhat more complicated. Notice that a tendency to make the sign for "dog" (slapping the thigh) as a result of seeing the word written "dog" is not textual behavior since there is no correspondence of any sort between the parts of the stimulus and the parts of the response. It is not unlike a tendency on the part of a bilingual person to say "perro" (the Spanish term) on seeing the word "dog"; in other words, it is intraverbal behavior. This illustrates the point that sign language is much more like a foreign language than like a special form of English.

But couldn't there be a form of textual behavior for signers other than fingerspelling? The answer is "yes". Sign textual behavior would require written symbols which did have a point-to-point correspondence with the various elements of the sign they controlled. Such a symbol system has been designed by William Stokoe and his colleagues (1965, 1972) at Gallaudet College in Washington, D.C. Stokoe classifies any given sign in terms of its hand configuration (designator), movement (signation) and location (tabulator). Notations for each specific topography are called Cheremes, which are analogous to phonemes in a vocal language (for a more detailed treatment of Stokoe's system see Neal, 1978).

Unfortunately, this system is new and not widely used by the deaf; therefore, no textual materials are available. As a result, our textual repertoire for the signing person must be that of English and will have to be taught as intraverbal behavior. This lack of point-to-point correspondence will weaken the textual repertoire; however, it can certainly be acquired.

A pointing symbol system usually contains the English word in each box. Therefore, to analyze the acquisition of English textual behavior would require the separation of the two verbal stimuli. However, pointing itself would constitute a type of textual behavior if, for example each stimulus pointed to was lit up on a display screen in the exact order touched. This technology is currently being developed.

Teaching One to Respond Correctly to Written Stimuli: As mentioned previously, for the first time in our treatment of language acquisition we must deal with each topography individually (vocal and sign).

A Vocal Textual Repertoire

A prerequisite for a phonetic approach to teaching reading is the ability to produce the appropriate phoneme under the control of a written stimulus. ("The Phonetic Approach" will be contrasted with the "Whole Word Approach" forced on us by our necessary treatment of Sign-English textual behavior as intraverbal behavior). This control can shift from copy control to written verbal control in the same manner as described earlier for developing non-verbal control, except that verbal control has point-to-point correspondence to the wanted response.

In teaching a student to read "ba", for example, the teacher must first have copy control -- that is, the student should be able to say "ba" as a function of the teacher saying "ba" (the teacher should already have stimulus control of this repertoire; if not, the student probably is not appropriate for textual training).

The next step is to bring various combinations of phonemes under written control, and then move on to larger units (words, sentences and paragraphs). Several procedures should be used to develop the textual repertoire. The student should have training on: 1) emitting the spoken word when shown an object (tacting), 2) matching the teacher's spoken word to the object, 3) matching the teacher's spoken word to the written stimulus, 4) phonetically matching a written stimulus, 5) matching a written stimulus with an object or action, and 6) matching an object or action with a written stimulus. These units, then, should be systematically increased in length and conceptual complexity.

In conclusion, the critical feature of teaching textual behavior is the fading of stimulus control from either non-verbal (tact) or copy stimuli to written stimuli (for a more detailed treatment of these

procedures, as well as various experimental issues within the field of reading, see Corey and Shamon, 1972; Sidman, Cresson and Willson-Morris, 1974).

A Sign Textual (Intraverbal) Repertoire

As mentioned previously, there is no point-to-point correspondence between a sign and a written stimulus (with the exception of Stokoe's notation system). Therefore, it is impossible for a student to sound out a word (if the student who has acquired sign language as a main form of verbal behavior has some appropriate vocal behavior this may be accomplished, to some degree). This means that the fading of stimulus control will be somewhat more difficult in that we lose a source of strength or, more precisely, correspondence between the stimulus and the response. This is commonly called the "whole word" or "sight word" approach to teaching reading. However, a textual repertoire can still be acquired by a non-vocal person (deaf persons certainly included) through intraverbal training. The procedure consists of: 1) emitting a sign when shown an object or action (tact), 2) matching the teacher's sign to an object or action, 3) matching the teacher's sign to the written stimulus, 4) matching a sign to a written stimulus, 5) matching a written stimulus to an object or action, and 6) matching a picture to a written stimulus.

As in vocal textual behavior, the units should increase in length and conceptual complexity. Our conclusion, however, is identical to that made with respect for vocal behavior; that is, the critical feature of teaching textual behavior to the signing individual is the fading of stimulus control from a copy or non-verbal stimulus to a textual stimulus. The difference between sign and vocal behavior is only seen in this lack of

point-to-point correspondence between the stimulus and the response. However, with the development of the Stokoe notation system the analyses are equal. (Note: The use of fingerspelling does provide a point-to-point correspondence between the stimulus and the response. This is, sort of, a bridge between a vocal language and a sign language. Maximum advantage should be taken of this. The procedure used is very close to that for developing vocal textual behavior. For a much more detailed treatment of the use of fingerspelling and signs for the development of English textual behavior, see Barmeier, 1978; and Neef, in preparation).

More Complex Verbal Behavior

What has been described so far are the elementary verbal relationships. These elements can be seen to constitute a large part of the child's verbal behavior, or that of the non-verbal person who is being taught some form of verbal behavior, and they constitute a useful basis for such instruction. But verbal behavior quickly becomes more complicated, with long and rapidly emitted sequences, controlled by events and relationships of extraordinary complexity. Part of this complexity is due to behavior controlled by private stimuli (stimuli which arise within the body of the speaker but which are not available to anyone else); some of it results from the fact that in most normal speaking or signing situations more than one controlling variable is present at a time, and the resulting behavior is the joint product of this multiple control; finally, a good deal of the complexity of ordinary speaking or signing arises from the development of secondary verbal behavior, mands and tacts which are controlled by other aspects of ongoing verbal behavior. Skinner called this type of verbal behavior "autoclitic" behavior. Such behavior is common for the normal speaker, but we have had little opportunity to experimentally

analyze its components with the hearing non-vocal person. However, this area is targeted for future research.

The Verbal Community

Our verbal environment generates and maintains our practices as speakers and listeners. In order for a verbal repertoire to develop, audiences which act as stimuli as well as provide consequences must be available. When such audiences are unavailable verbal behavior weakens. This is exemplified by cases where a child fails to develop a verbal repertoire when isolated for an extended period of time.

When our main interest is to teach verbal behavior to someone in whom it is absent or defective, we can't afford to overlook the critical nature of a reinforcing verbal community. People must reinforce new words as they are trained; they must present stimuli which evoke verbal behavior so they can reinforce its occurrence. The community must serve as a resource for new information (e.g., new tacts, mands, intraverbals). This can only happen if such a community exists. Also, the verbal community plays an important role in teaching a person to describe the states of his own body.

A recent study was conducted by this author and colleagues on the effects of a verbal community on the usage of a newly acquired sign repertoire. The data indicate that such a community will greatly increase the frequency of emitting appropriate verbal behavior (Sundberg, Milani and Partington, 1977). Research in this area is just beginning; however, it is clearly a necessary component of any language program (for a more detailed treatment of the nature of a verbal community see especially Skinner, 1957; Appendix; Chapter 2, Skinner, 1974).

Summary

The application of the conceptual tools described by B.F. Skinner in his book Verbal Behavior (1957) has greatly improved our understanding of language development and training. These tools provide a clear framework which one can follow when dealing with language and its related problems. The implications and ramifications of this analysis are incredible. However, at this point, experimental research is greatly needed in several of the areas described. Such data should further our understanding of how and why organisms verbally behave, as well as what to do when such behavior is weak.

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Also, the author encourages suggestions, comments and data that will improve our understanding of verbal behavior.

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(Appendix 1)

B.F. SKINNER'S VERBAL BEHAVIOR

The Elementary Relationships

<u>CONTROLLING VARIABLES</u>	<u>RESPONSE</u>	<u>CONSEQUENCE</u>
Establishing Operation	Mand (asking)	Specific Thing/Action Manded
Non-Verbal Stimulus	Tact (naming)	Social (Non-Specific)
Verbal Stimulus <u>Has:</u> Point-to-Point Correspondence with Formal Similarity	Imitative Copy Written Echoic	Social
Verbal Stimulus <u>Without:</u> Point-to-Point Correspondence	Intraverbal (conversation)	Social
Verbal Stimulus (Written) <u>With:</u> Point-to-Point Correspondence	Textual (reading)	Social
Verbal Stimulus (Vocal) Point-to-Point Correspondence	Transcriptual (writing)	Social

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Verbal Stimulus <u>Without:</u> Point-to-Point Correspondence	Intraverbal (conversation)	Social
Verbal Stimulus (Written) <u>With:</u> Point-to-Point Correspondence	Textual (reading)	Social
Verbal Stimulus (Vocal) <u>With:</u> Point-to-Point Correspondence	Transcriptive (writing)	Social

THE BASIC TERMS USED IN B.F. SKINNER'S
ANALYSIS OF VERBAL BEHAVIOR

Copy Behavior

Copying can be understood as a type of verbal behavior where a verbal stimulus is repeated by the respondent (e.g., "mmm - mmm", "Book - Book", "How are you? - How are you?").

Verbal Stimulus: That which has a specific topography which has controlling effectiveness. A verbal stimulus is the result of verbal behavior. The more common verbal stimuli are, for example, spoken and written words, signs, symbols, morse code, semaphore flags, etc.

Formal Similarity: This occurs when the stimulus and the response are in the same sense mode.

- Example: 1. Vocal-vocal
2. Visual-visual

Point-to-Point Correspondence

The beginning, middle and end of the stimulus match the beginning, middle and end of the response.

"D - O - G"

"D - O - G"

- For Example: 1. You say "good" because someone else said "good".
2. You write "Test on Friday" because it was written on the blackboard and you don't want to forget.

Mand Behavior

The mand can be understood as a type of verbal behavior where what is said is determined by what the speaker wants (e.g., "Give me that!", "Where is class?", "Move, please", "Break it!").

Establishing Operation: Any change in the environment of the person which alters the value of objects or events as a form of reinforcement. Also, it automatically alters the strength of the repertoire that has been developed with that form of reinforcement.

- Example:
1. A tendency to say "let's go dancing at that time" because dancing would function as reinforcement (social mand).
 2. A tendency to say "can I have some water" because water would function as reinforcement (biological mand).

Tact Behavior

The tact can be understood as a type of verbal behavior where things, actions, etc., are named (e.g., "That is a Rembrandt", "That bolt is too large", "The cup is broken").

Non-Verbal Stimulus: These consist mainly of objects, actions, properties of both objects and actions, and relationships between both. A non-verbal stimulus can be auditory, visual, tactile, olfactory or gustatory.

- Example:
1. A tendency to say "airplane" because you hear one.
 2. A tendency to say "rough" because you feel sandpaper.
 3. A tendency to sign "grape" because you taste the flavor.

Intraverbal Behavior

Intraverbal behavior can be understood as a type of verbal behavior where a verbal response is controlled by a different verbal stimulus. Therefore, there is no point-to-point correspondence between the stimulus and the response.

- Example:
1. You have a tendency to say "pen" because someone asked "What can I write with?"
 2. You have a tendency to sign "You're welcome" because someone signed "Thank you".

Textual Behavior

Textual behavior can be understood as a type of verbal behavior where written stimuli control vocal-verbal responses (sign textual behavior is also possible). There is point-to-point correspondence; however, only

thematic similarity.

Transcriptive Behavior

Transcriptive behavior can be understood as a type of verbal behavior where a sign/vocal-verbal stimulus controls a written response.

There is point-to-point correspondence.

- Example:
1. You write "ball" because someone says "ball".
 2. You write the notation for "animal" because someone signed "animal".